

‘CONSTRUCTION OS&H’: A FREE, COMPREHENSIVE TRAINING PACKAGE IN OCCUPATIONAL SAFETY AND HEALTH FOR THE CONSTRUCTION INDUSTRY

Richard Neale¹ and Fiona Murie²

*¹Visiting Professor of International Development, University of Winchester, United Kingdom
Emeritus Professor of Construction Management, University of South Wales*

²Global Director, Health and Safety and Construction, Building and Woodworkers International, Geneva, Switzerland

Construction remains one of the industries with very high rates of accidents and ill-health, and many of the ‘accidents’ are not accidents at all, but occupational safety and health ‘incidents’, because they could have been avoided by good practices, procedures and equipment, together with appropriate knowledge and responsible attitudes. This problem is at least partially related to lack of proper training. A worldwide analysis by the International Labour Office (ILO) in 2007 concluded that there was a shortage of comprehensive, internationally relevant training materials freely available in the public domain.

Construction OS&H is an international occupational safety & health (OS&H) training package, freely available to download from the ILO web site. It is designed specifically for four main groups: clients; design and project management teams; construction companies (‘contractors’); and workers; but it will also be useful to other groups, such as government inspectors and company OS&H officers. It provides trainers with a substantial digital resource, rather than set of four linear programmes, so that competent trainers can adapt the contents for a specific programme. It comprises seven main components:

Tutors’ Guide. This explains the content of the package and how to use it.

Knowledge Base. This provides the main sources of the content of the package and includes **Downloads** of some of the sources.

Theme Summaries. **Construction OS&H** is based on 15 Theme Summaries, typically 25-30 pages each, totalling 424 pages, which provide most of the educational content of the programme.

PowerPoint Presentations (PPPs). A PPP has been compiled from each Theme Summary, typically 50 slides each, totalling 802 slides.

Model Courses. Although this is a very flexible resource, four Model Courses are provided, one each for clients, design & project management teams, construction companies and workers.

Participants’ Handbooks. The content of each Model Course has been summarised for printing as a Participants’ Handbook.

Web site. All the above is available on an ILO web site, for free downloading.

The package was validated in depth by bringing together 24 professionals - practicing engineers, academics, trainers, government officials, trades union officials, contractors and consultants - from four African countries, for a two-day workshop in Dar es Salaam, Tanzania, in 2009. The package was then refined and published on the ILO web site in 2011.

Evaluating the practical use of Construction OS&H is difficult because it is freely available for downloading from the ILO web site for anyone to use as they wish. The evidence that we have is that one of the authors used it extensively in a five-day course in Panamá, where it was found to be very effective. A call for feedback from ILO offices around the world reported that an independent consultant used it as the basis for a course in Paraguay, which had very favourable evaluations (summarised in the paper) and that it has been used in courses in Azerbaijan, Kenya, Tajikistan and Tanzania, although it has not been possible to obtain evaluation reports.

Keywords: construction industry, safety and health, international, training materials, free download.

¹ Richard.Neale@winchester.ac.uk

INTRODUCTION

High standards of safety should be an objective pursued in the same way and with as much vigour as other management objectives. The aim of most development projects is to improve the general well-being of the inhabitants of the country concerned. It is a reasonable humanitarian aim to ensure that the well-being of the people engaged in the project itself is preserved and perhaps enhanced. (Austen and Neale 1984: 93)

Construction OS&H is a package of training materials and guidance in its use. It was the result of an initiative by the International Labour Office (ILO) and Building and Woodworkers International (BWI). The ILO is a major specialised agency of the United Nations:

The ILO was founded in 1919, in the wake of a destructive war, to pursue a vision based on the premise that universal, lasting peace can be established only if it is based on social justice. The ILO became the first specialized agency of the UN in 1946.

The main aims of the ILO are to promote rights at work, encourage decent employment opportunities, enhance social protection and strengthen dialogue on work-related issues. [ILO web site, www.ilo.org]

The ILO has summarised its mission in two words: “Decent Work”. At a more specific level, the ILO Sectoral Activities Department (SECTOR) promotes decent work by addressing social and labour issues in specific economic sectors, both at international and national levels. The construction industry is an important sector for consideration and it was through SECTOR that this package was developed and published, in partnership with the ILO’s “Programme on Safety and Health at Work and the Environment”.

The ILO is a tripartite organization, the only one of its kind bringing together representatives of governments, employers and workers in its executive bodies. This facilitates (and expects) cooperation between important parties in national economies, and in the case of this training package the construction specialist in SECTOR worked with BWI.

BWI is the Global Union Federation grouping free and democratic unions with members in the Building, Building Materials, Wood, Forestry and Allied sectors. The BWI groups together around 326 trade unions representing around 12 million members in 130 countries. BWI’s mission is:

To promote the development of trade unions in our sectors throughout the world and to promote and enforce workers rights in the context of sustainable development. [BWI web site, www.bwint.org]

The construction industry is a notoriously hazardous industry in which to work:

- *In industrialized countries, construction workers are 3-4 times more likely than other workers to die from accidents at work.*
- *In developing countries, the risks associated with construction work are estimated to be 3 to 6 times greater in comparison to developed countries.*

[ILO 2014: slide 12]

Construction OS&H was developed through a systematic process during the period 2003 to 2011. A statistical review by the ILO in 2003 found that about 250 million workers suffer

accidents in the course of their work, and over 300,000 are killed every year (ILO 2003). The ILO further ascertained that: *In the construction industry, at least 60,000 people are fatally injured on building sites every year. Many hundreds of thousands more suffer serious injuries and ill health.*

Effective training is obviously a crucial element in any serious attempt to improve the occupational safety and health (OS&H) of workers in this industry and training has to be based on sound training materials. In 2007 the ILO commissioned consultants to conduct a review of the training materials readily available to potential trainers worldwide (ILO 2007). The following are extracts:

This analysis concluded that there was indeed a shortage of OSH and project management training materials to be found in the public domain and that those that could be found tended to be generic, and not focused on the construction sector. Those materials found bespoke to the construction sector themselves varied greatly in quality and were in many cases obsolete in the context of the modern construction environment, characterized by complex contractual and employment relationships, often lacking clarity in the flow of responsibilities for OSH.

The remedy is the production of a universally applicable compendium of OSH and Project Management training materials relevant to a global audience and applicable in a variety of legislative environments, bespoke for the construction sector and the various actors active within the sector. This compendium of training materials needs to be made available for dissemination through the public domain to provide equality of access globally and to ensure that those most at need have access to good quality and current OSH and Project Management training materials.

In response to this study, ILO developed a project proposal through its normal processes and in 2008 funds were provided to commission the authors of this paper to write a training package. The Terms of Reference (ToR) ran to 12 pages but the quotation above gives the principal requirements. A draft of the package was reviewed by the ILO officials managing the project at a meeting with the authors (which approximated to an all-day PhD viva) and the package was refined and a new draft was completed, which was validated through a two day 'Expert Workshop' in Dar es Salaam, Tanzania, in 2009. The final version was put on the ILO construction sector web site in 2011. This was obviously a protracted process but had the rigour necessary to formulate a well-researched training package to the standard required by a major UN agency.

This paper begins with an explanation of the overall educational principles and design, followed by a summary of the content and sources. A series of examples illustrates the form and content of the package, and the validation process is described. The paper concludes with a review of its practical use with case studies in Panamá and Paraguay, and some conclusions.

EDUCATIONAL PRINCIPLES OF CONSTRUCTION OS&H

The main principle on which Construction OS&H is based stems from the educational principle that an effective training programme must be designed to meet specific training objectives and give full consideration to the relevant characteristics of the intended trainees, the venues and facilities to be used, funding and time available, and other contextual factors. Thus it is unlikely that a training package offering 'standard courses' will be universally useful. Furthermore, the extensive experience of the authors of this paper had shown that trainers very rarely use standard training packages as a whole; they

do not use them ‘straight out of the box’ but adapt them to suit specific circumstances and use parts of them in combination with other material. So, at the design stage of Construction OS&H the decision was made that it would be a flexible resource rather than a set of prescriptive course programmes. This decision led to the package being based on a number of Themes, each of which would comprise a substantial body of information. The Themes provide most of the content of Construction OS&H, and so are good bases for the documentation (handouts, manuals etc) required by training programmes. To provide a resource for the delivery of the material, a PowerPoint Presentation (PPP) was compiled for each Theme.

Although the package was designed for flexible use, the ToR also envisaged a training package of four fairly prescriptive courses, one for each of four ‘actors’ in the construction industry: *clients; consultants, architects, engineers, project coordinators; prime contractors and subcontractors; and workers in the various trades*. So, the material from the Themes and PPPs was assembled into four ‘Model Courses’ for each of these ‘actors’, so illustrating how the package could be used in practice.

A second important principle is that Construction OS&H considers OS&H to be an essential element of construction project management rather than a specialised subject. It is obviously the duty of all involved in a project to take OS&H seriously themselves, as individuals, rather than seeing it as a job for specialists.

Thirdly, the whole subject was treated systematically and recognised national and international systems, processes and procedures.

A final principle relates to education theory. The authors hope that those who use Construction OS&H will realise that quite a lot of educational skill has gone into its creation, but at its most simple the learning aphorism of Confucius provided a guiding principle (Yang and Lau, 1979): *I hear and I forget; I see and I remember; I do and I understand*.

Thus an effective training programme must have an appropriate balance of formal teaching, visual stimulation and active participation through exercises such as discussions, case-studies, site visits, etc.

CONTENT OF CONSTRUCTION OS&H

The content was obtained from wide ranging international literature searches, supplemented by the authors’ own information. Many of the photos used are by the authors, some of them taken especially for the package.

Theme summaries

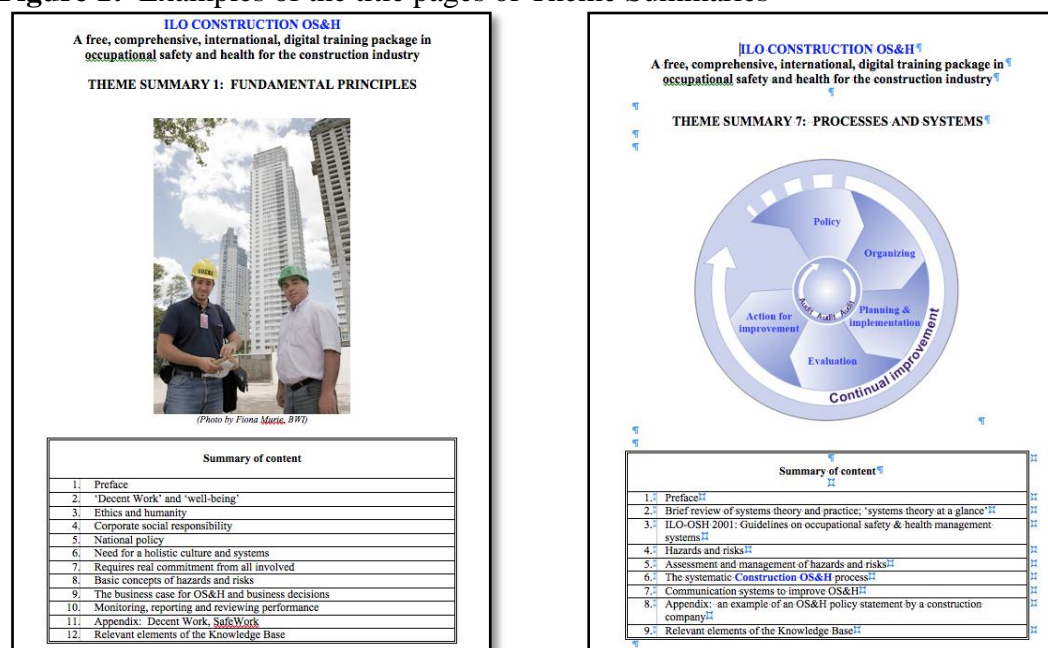
Construction OS&H is based of 15 Theme Summaries, typically 30 A4 pages each, totalling 424 pages. These provide the Tutor with an extensively illustrated, comprehensive body of information, from which training course materials can be selected and edited. Theme Summaries are numbered 1-15. The structure and content were derived from a study of legal documents, textbooks, training manuals and other published material. The headings and subheading from these documents were transcribed into a spreadsheet, which yielded a large compendium of phrases. By inspection, phrases of broadly similar meaning were grouped together in a new spreadsheet, so creating a rough thematic structure. The authors used their expertise to assess and shape this structure to

produce the set of themes in Table 1. As an illustration, the title pages of two Theme Summaries are given in Figure 1, which demonstrates the visual character of Construction OS&H.

Table 1: Theme sets and titles

Fundamental themes	Theme Number
Fundamental principles	1
General duties	2
Safe and healthy working environment	3
Workers' perspectives	4
Project management themes	
Principles of safe project management	5
Project planning and control for OS&H	6
Processes and systems	7
Welfare and project site	8
Technical themes	
Personal protective clothing & equipment (PPE)	9
General plant and equipment	10
Vertical movement	11
Horizontal movement	12
Working at or below ground level	13
Working at height	14
Integration and conclusion	
Project, concluding case study, evaluation	15
Further technical themes for future development	
A number of more specialist Themes were suggested for future development, such as tunnelling	

Figure 1: Examples of the title pages of Theme Summaries



A PowerPoint presentation was derived directly from each Theme Summary, typically 50 slides each, totalling 802 slides. These can be selected and edited for specific training events to match the selection from the Theme Summaries. PowerPoint presentations are

the main medium for communicating the training content, so these presentations also include exercises and instructions to the course participants. The PowerPoint Presentations are numbered 1-15, corresponding to the Theme Summaries. Figure 2 shows examples of two title slides for the PPPs and Figure 3 gives examples of slides to stimulate discussion.

Figure 2: Examples of title slides for PPPs

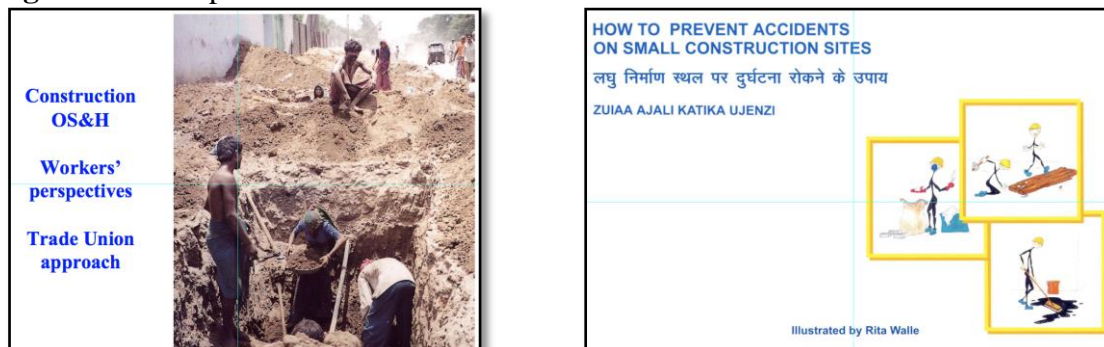
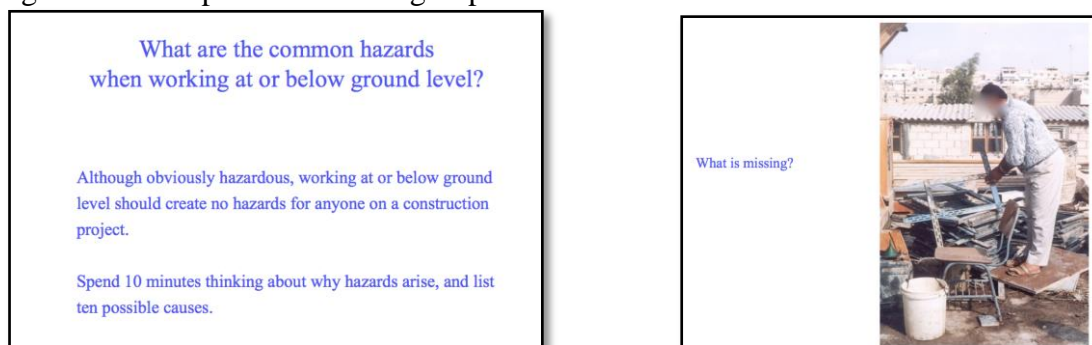


Figure 3: Example of slides for group discussion



Other elements of Construction OS&H

Tutors' Guide. This explains the content of the package and how to use it.

Knowledge Base. This provides the principal sources of the content of the package (61 references) and includes **Downloads** of some of the main sources.

Model Courses. Four Model Courses are provided, one each for clients, design & project management teams, construction companies and workers.

Participants' Handbooks. The content of each Model Course has been summarised in a printed Participants' Handbook.

Other materials. These include a few PPPs from other sources, a PPP based on an ILO booklet which avoids language difficulties by only uses cartoon-type illustrations (See the second example in Figure 2) and a couple of 'Toolbox Briefings' which can be used for on-site training.

Web site. All the above is available on the ILO web site, for free downloading.

VALIDATION

A complete draft was validated through a two-day workshop in Dar es Salaam, Tanzania. The participants were all senior people from a suitable range of institutions, as shown in Table 2.

Table 2: List of participants – validation workshop Dar es Salaam 28 & 29 October 2009

No.	INSTITUTION	Country
1.	Ministry of Infrastructure Development	Tanzania
2.	Ministry of Gender, Labour and Social Development	Uganda
3.	Uganda Building Union	Uganda
4.	Construction company	Tanzania
5.	Construction company	Tanzania
6.	Construction company	Tanzania
7.	Institution of Engineers, Tanzania	Tanzania
8.	University of Dar es Salaam	Tanzania
9.	Occupational Safety and Health Authority (OSHA)	Tanzania
10.	Association of Consulting Engineers Tanzania (ACET)	Tanzania
11.	Kenya Building Union	Kenya
12.	University of Dar es Salaam	Tanzania
13.	ILO Pretoria Office	RSA
14.	Tanzania Occupational Health Services (TOHS)	Tanzania
15.	Dar es Salaam Institute of Technology (DIT)	Tanzania
16.	Dar es Salaam Institute of Technology (DIT)	Tanzania
17.	Engineers Registration Board, (ERB) Tanzania	Tanzania
18.	Building and Wood Workers International (BWI)	Kenya
19.	Tanzania Mine and Construction Workers Union	Tanzania
20.	Tanzania Mine and Construction Workers Union	Tanzania
21.	Social Business consultancy	Tanzania
22.	Ardhi University	Tanzania
23.	Tanzania Civil Engineering Contractors Association	Tanzania
24.	Tanzania Civil Engineering Contractors Association	Tanzania

The validation process began with a plenary session at which a summary of the package was presented and discussed. Each participant was given a full print out of the package plus the same content on DVD. The participants were divided into four groups and each was asked to consider the package from the point of view of one of the ‘actors’ for whom the package had been designed. They were asked to review the package against the ToR but also to review the technical content and to suggest on how they would use it in practice. The Workshop concluded with an afternoon of group presentations and discussions, from which a set of revisions was agreed.

This was a lively, very positive and useful event. The draft of Construction OS&H came through it very well and it was then revised as agreed and put on the ILO web site in 2011.

EVALUATION THROUGH TWO CASE STUDIES

Evaluating the practical use of Construction OS&H is difficult because it is freely available for downloading from the ILO web site for anyone to use as they wish. From a call for feedback from ILO offices around the world we know that Construction OS&H has been used in courses in Azerbaijan, Kenya, Tajikistan and Tanzania, but at the time of writing this paper we have not been able to obtain any information to assess its effectiveness. We do have information about its use in Panamá and Paraguay, which is summarised in the case studies below. Although the original package was entirely in the English language, the ILO had it translated

into Spanish, which is one of the official languages of the UN system, which facilitated its use in these countries.

Case Study 1: Use in Panamá

This was OS&H training for construction workers through a five-day course held in Ciudad de Panamá. The lead trainer was the second author of this paper.

The course was ‘made to measure’ for the Panamanian Trade Union, SUNTRACS. The content was based on the training materials for the Workers’ Model Course as a general foundation, but with substantial additions and adaptations. The subjects covered are summarised in Table 3.

Table 3: Summary of the content covered

Introduction
Trade Union Approach
Welfare & Project Site
Personal Protective Equipment
Organising for Health and Safety Workplace
General Plant and Equipment
Vertical Movement
Horizontal Movement
Working at or Below Ground
Working at Height
Getting Management to Make Improvements
Site visit

This course demonstrated how Construction OS&H was intended to be used; that is, as a substantial resource adapted in partnership with those involved in providing the training to serve specific training needs.

The course participants had all received previous training on OS&H and were all experienced trade union OS&H representatives on large infrastructure projects, and four were full time organisers and trainers for the Union. SUNTRACS represents over 100,000 members in the construction industry in Panama and has a national industry Collective Bargaining Agreement with CAPAC, the Construction Contractors Association of Panamá, which covers OS&H arrangements for the sector in some detail.

In order to meet the specific needs of the SUNTRACS union, the course took account of the current situation in the construction industry in Panamá City. This allowed participants to focus on the most relevant hazards and prevention issues, also key speakers on construction OS&H were invited to come each day to give talks and to engage in discussions. These included OS&H specialists from the Panamá Canal Authority (ACP), the Consortium for the Canal Expansion (GUCP), the company building the Panamá Metro (FCC), the Ministry of Labour Inspectors, and the Construction Contractors Association (CAPAC), as well as short inputs from speakers from the ILO offices in Panamá and Costa Rica.

The Union had requested special emphasis to be placed on the training modules covering work below ground and horizontal movement. This is of particular relevance because of large new infrastructure works in Panama. Firstly, the Panama Canal Expansion Project, which began last July, currently employs almost 3,000 workers, and is due to reach 7,000

workers this year (2014). The characteristics of this project created a particular need for training on working with and around heavy plant and equipment, horizontal movement and site planning and provision of welfare facilities. Furthermore, at the end of February 2011, a new agreement on OS&H was reached between SUNTRACS and the consortium Grupo Unidos Por el Canal (GUPEC). The agreement establishes a new OS&H system, with Trade Union OS&H representatives, OS&H Committees, daily joint inspections and weekly meetings on OS&H. Therefore the Trade Union was keen to receive specific training to support the OS&H representatives from the site.

The participants concluded that the training course had provided the union with valuable information resources, which they intend to communicate and use with local branches and with OS&H representatives around the country. It was felt that the technical information was of high quality, very well presented and (above all) timely and relevant to the current needs of the Trade Union.

From the point of view of the trainer, the materials are sufficiently comprehensive and flexible so as to be readily adaptable to different country contexts and levels of development. In the case of Panama, the construction industry is quite sophisticated, and the materials worked well, with use of pertinent country information and drawing on the participation and first hand knowledge of industry partners.

Case study 2: Evaluation report from Paraguay

Construction OS&H was used by an independent consultant for a training course in Paraguay. A statistical summary of the participants' evaluation is given in Table 4.

Table 4: Evaluation of a training course in Paraguay (translated from Spanish)

Questions	Average (scale 1-5)	% 4 & 5	Estimated deviation	No. of replies
1 Before the course, did you know its objectives, content and methodology?	3.33	37%	1.15	27
2 After completing the course, are the training objectives clear?	4.68	100%	0.47	28
3 Have the training objectives been achieved?	4.50	89%	0.68	28
4 Did the content meet the objectives?	4.61	96%	0.56	28
5 Were the contents tailored to take account of previous knowledge?	4.15	78%	0.85	27
6 How do you rate the gender balance in the content, methodology and materials?	4.33	88%	0.69	24
7 Do you think the teaching methodology was appropriate?	4.39	89%	1.08	28
8 How do you rate the contribution of the course tutors and specialists?	4.74	100%	0.44	27
9 Do you feel the group of course participants facilitated you learning?	4.07	85%	0.72	27
10 Do you feel that the materials used were appropriate?	4.74	96%	0.52	27
11 Do you feel the course was well organised?	4.56	96%	0.68	27
12 Do you feel the course secretariat was efficient?	4.65	96%	0.55	26
13 Are you satisfied with the quality of the training course?	4.63	96%	0.55	27
14 Do you think it is probable that your institution/employer will benefit from your participation in this training?	4.07	74%	0.86	27
15 Do you think it is probable that your career will benefit from your participation in this training?	4.19	81%	0.72	27
Average	4.38	87%		

It is clear from the numerical data that this was a successful event. Obviously the course was conducted by a competent trainer, but the data demonstrate that the training package

can be used successfully quite independently of its authors. Question 10 refers directly to the training materials, and the responses to question 13 would have been influenced by them, so these are very pleasing results. Questions 4 (objectives), 6 (gender) and 7 (methodology) would have been derived – at least in part – from the package so these results are also very pleasing. In terms of the overall effectiveness of the package, questions 14 and 15 very important, so the average scores (>4) are very satisfactory.

CONCLUSIONS AND RECOMENDATIONS

Construction OS&H is a substantial training resource. It was developed in a systematic way over a period of a few years. The final output was a very flexible set of training materials *intended to be useful for a worldwide audience and to be universally applicable for different countries and contexts*. It was carefully validated through an ‘Expert Workshop’ and the two case studies show that it has been used successfully in Panamá and Paraguay. It has also been used in courses in Azerbaijan, Kenya, Tajikistan and Tanzania.

It is free to download from the ILO web site:

In English: http://www.ilo.org/sector/Resources/training-materials/WCMS_161706/lang-en/index.htm

In Spanish: <http://www.oitcinterfor.org/es/recurso-did%C3%A1ctico/seguridad-salud-trabajo-industria-construcci%C3%B3n-programa-formaci%C3%B3n-oit>

Any further formal developments of the package will require the ILO to initiate a follow-up project and this will depend on user feedback, demand from member states and funding priorities. More realistically, the whole package is free to download and edit, so future developments are largely in the hands of users. The authors wrote this paper for this conference in the hope that it would be of interest to an international group of scholars who have a commitment to this subject, so perhaps some of you will develop it further. The authors would be pleased to engage in discussions on possibilities, although we have no funding at present.

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